

OKLAHOMA STATE UNIVERSITY - BUILDING DESIGN STANDARDS

PART 1 GENERAL

1.01 Intent of Document

- A. This procedure includes all underground and above ground potable water lines for new construction projects and major renovation projects. The intent of the program is to ensure compliance with the methods and procedures outlined in ANSI/AWWA Standard C651-05 and meet the bacteriological standards as established by the Oklahoma Department of Environmental Quality and by the United States Environmental Protection Agency.

1.02 Program Description

- A. This procedure was developed to assure potable water lines are properly disinfected and meet the American Water Works Association Standard for community water systems.

1.03 Scope

- A. This procedure includes all underground and above ground potable water lines for new construction projects and major renovation projects. The intent of the program is to ensure compliance with the methods and procedures outlined in ANSI/AWWA Standard C651-05 and meet the bacteriological standards.

1.04 Definitions

- A. AWWA: American Water Works Association.
- B. ANSI: American National Standards Institute
- C. ANSI/AWWA Standard C651-05: The current industry practice for the disinfection of underground potable water distribution lines.
- D. Above ground potable water lines: All potable water lines downstream from the water meter.
- E. CFU/ml: Coliform Forming Units per milliliter of water.
- F. Potable Water: Water fit for human consumption.
- G. Sample cock: The end of the distribution line used for water sampling.
- H. Slug Method: Calcium hypochlorite tablets are placed in each section of water lines as the lines are installed.
- I. Underground potable water lines: All potable water lines upstream from the water meter.

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PART 2 MATERIALS

Not used.

PART 3 EXECUTION

3.01 Responsibilities

- A. The General Contractor is responsible for performing all analytical tests and verifying that the building's plumbing system meets the minimum bacteriological standards as set forth by the Oklahoma Department of Environmental Quality.
- B. The Oklahoma State University (OSU) Architectural & Engineering Inspection Services is responsible for overseeing the entire disinfection procedure including verification of the chlorine residual.
- C. The General Contractor will provide the personnel, equipment and materials necessary to perform the actual disinfection of the underground lines in compliance with ANSI/AWWA Standard C651-05.
- D. When a subcontractor performs the disinfection procedure, it is the joint responsibility of both the General Contractor and designated subcontractor to comply with this procedure.

3.02 Specific Program Components

- A. Underground Potable Water Lines
 - 1. Standard Disinfection Procedure for all Underground Potable Water Lines
 - a. The forms of chlorine that may be used in the disinfection operations are liquid chlorine, sodium hypochlorite solution or calcium hypochlorite granules or tablets. Calcium hypochlorite tablets must conform ANSI/AWWA standard B300. Do not use calcium hypochlorite intended for swimming pool disinfection, as this material has been sequestered and is extremely difficult to remove from the pipe after desired contact time has been achieved.
 - b. The Slug method is preferred by OSU Architectural & Engineering Inspection Services. Inspection Services requires the initial chlorine residual to be at least 100 ppm (100 mg/L) for a continuous 12 hour period minimum. Tablet or continuous feed methods will require approval by OSU Architectural & Engineering Inspection Services prior to the installation of the underground piping.
 - c. OSU Architectural & Engineering Inspection Services will verify the chlorine residual at the end of the retention time and issue a flush order.
 - d. Continuously flush the entire system with the clear potable water. The flush water shall be directed into a sanitary sewer system in accordance with the campus Stormwater Management Plan. Alternative methods of collection of the flush water can be utilized with prior approval from OSU Architectural & Engineering Inspection Services.

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- e. Monitor the chlorine residual in the effluent on a periodic basis. When the chlorine residual is equal to the chlorine residual in the distribution system, the system has been properly flushed. The General Contractor will contact a state certified water laboratory to arrange for bacteriological testing.
- B. Bacteriological Analysis of the Underground Potable Water Lines
1. The General Contractor will sample the water system effluent from the sample cock in accordance with proper laboratory sampling procedures. The Total Coliform Count Method, as summarized in "Standard Methods for Examination of Water and Wastewater" A.P.H.A., will be used to verify the bacteriological water quality.
 2. The General Contractor shall demonstrate compliance with the minimum standards of bacteriological water quality for two consecutive samples taken 24 hours apart.
 3. When all samples demonstrate that the water system meets the minimum standards, OSU Architectural & Engineering Inspection Services will sign off on the disinfection procedure.
 4. The minimum standards are:
 - a. Total Coliform count = zero.
 - b. Heterotrophic plate count: 500 CFU/ml or less.
- C. Emergency Slug Method
1. In cases of emergency when the system must be returned to service as soon as possible, a chlorine residual of 325 ppm with a contact time of only 15 minutes may be used with prior approval by OSU Architectural & Engineering Inspection Services. The affected section can be flushed and returned to service if the chlorine residual is not less than 300 ppm after 15 minutes from when the emergency methods were employed. After flushing, the General Contractor shall verify that the chlorine residue is below 4.0 ppm and receive permission from the OSU Construction Project Manager, before placing the line back into service.
 2. OSU Architectural & Engineering Inspection Services will arrange to sample the system to ensure the water meets minimum bacteriological standards after the system has been placed back into service.
- D. Above Ground Potable Water Lines
1. Chlorination Procedure for the Above Ground Potable Water Lines
 - a. OSU Architectural & Engineering Inspection Services will verify ALL underground distribution lines (upstream from the meter) have been properly disinfected.
 - b. The General Contractor shall notify OSU Architectural & Engineering Inspection Services 72 hours in advance of the time, location, and duration of the planned flushing.
 - c. The General Contractor will thoroughly flush the entire building distribution system with clear potable water. When complete, the General Contractor will then notify the OSU Architectural & Engineering Inspection Services.
 - d. The General Contractor will contact a state certified potable water laboratory to arrange for bacteriological testing of the new system. The time and place of sampling for bacteriological testing shall be conveyed to OSU Architectural & Engineering Inspection Services 72 hours in advance of the test.

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E. Bacteriological Analysis for the Above Ground Potable Water Lines

1. The General Contractor will sample the water system effluent from the sample cock according to standard laboratory collection procedures. The Total Coliform Count Method, as summarized in "Standard Methods for Examination of Water and Wastewater" A.P.H.A., will be used to verify the bacteriological water quality.
2. OSU Architectural & Engineering Inspection Services may conduct a Heterotrophic Plate Count of water samples from the safety showers and eyewash stations. Ensure the drinking fountains, safety shower and eyewash stations have been thoroughly flushed.
3. The General Contractor shall demonstrate compliance with the minimum standards of bacteriological water quality for two consecutive samples taken 24 hours apart.
4. When all samples demonstrate that the water system meets the minimum standards, OSU Architectural & Engineering Inspection Services will sign off on the disinfection procedure.
5. The minimum standards are:
 - a. Total Coliform count = zero.
 - b. Heterotrophic plate count: 500 CFU/ml or less.

3.03 Reporting Requirements

- A. The General Contractor will notify OSU Architectural & Engineering Inspection Services of all scheduled building chlorination procedures at least 72 hours prior to disinfecting the potable water system.

3.04 Information and External References

- A. American Water Works Association
- B. Oklahoma Department of Environmental Quality Rules and Regulations

END OF SECTION 02514